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Amendment

In the Claims:

Claims 1-3 **(canceled)**

Claim 4 **(currently amended)** An engineered β-Ketoacyl-acyl carrier protein synthase protein comprising an amino acid sequence (i) wherein said amino acid sequence of said engineered β-Ketoacyl-acyl carrier protein synthase protein has a substitution of at least one amino acid residue selected from the group consisting of amino acid residues at a position corresponding to residue 108, 111, 114, 133, and 197 of SEQ ID NO: 47, and (ii) wherein said substitution is of a ~~nonpolar side chain~~hydrophobic residue to a ~~different nonpolar side chains~~maller residue, and (iii) wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein increases long chain fatty acid accumulation compared to a β-Ketoacyl-acyl carrier protein synthase protein having at least one unaltered amino acid residue selected from the group consisting of amino acid residues at a position corresponding to residue 108, 111, 114, 133, and 197 of SEQ ID NO: 47.

Claim 5 **(previously presented)** The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein said β-Ketoacyl-acyl carrier protein synthase protein is obtained from a prokaryotic source.

Claim 6 **(previously presented)** The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein said β-Ketoacyl-acyl carrier protein synthase protein is obtained from *Escherichia coli*.

Claim 7 **(previously presented)** The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein said β-Ketoacyl-acyl carrier protein synthase protein is obtained from a plant source.

Claims 8-28 **(canceled)**

Claim 29 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein fatty acid production of said engineered β-Ketoacyl-acyl carrier protein synthase protein is altered such that short chain fatty acid accumulation is decreased compared to a β-Ketoacyl-acyl carrier protein synthase protein having said at least one unaltered residue.

Claim 30 (**currently amended**) An engineered β-Ketoacyl-acyl carrier protein synthase protein comprising an amino acid sequence (i) wherein said amino acid sequence of said engineered β-Ketoacyl-acyl carrier protein synthase protein has a substitution of at least one amino acid selected from the group consisting of amino acid residues at a position corresponding to residue 108 and 193 of SEQ ID NO: 47, and (ii) wherein said substitution is of a ~~nonpolar side chain~~ hydrophobic residue to a ~~different nonpolar side chain~~larger hydrophobic residue, and (iii) wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein preferentially accumulates fatty acids having a shorter chain length compared to a β-Ketoacyl-acyl carrier protein synthase protein having at least one unaltered amino acid residue selected from the group consisting of amino acid residues at a position corresponding to residue 108 and 193 of SEQ ID NO: 47.

Claim 31 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 30, wherein said β-Ketoacyl-acyl carrier protein synthase protein is obtained from a prokaryotic source.

Claim 32 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 30, wherein said β-Ketoacyl-acyl carrier protein synthase protein is obtained from *Escherichia coli*.

Claim 33 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 30, wherein said β-Ketoacyl-acyl carrier protein synthase protein is obtained from a plant source.

Claim 34 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 30, wherein fatty acid production of said engineered β-Ketoacyl-acyl carrier protein synthase protein is altered such that long chain fatty acid accumulation is decreased compared to a β-Ketoacyl-acyl carrier protein synthase protein having said at least one unaltered residue.

Claim 35 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 30, wherein (i) said amino acid residue corresponding to the residue at position 108 of SEQ ID NO: 47 is selected from the group consisting of isoleucine, leucine, and methionine and wherein (ii) said amino acid residue is substituted with phenylalanine.

Claim 36 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 30, wherein (i) said amino acid residue corresponding to the residue at position 108 of SEQ ID NO: 47 is selected from the group consisting of isoleucine and methionine and wherein (ii) said amino acid residue is substituted with leucine.

Claim 37 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 30, wherein (i) said amino acid residue corresponding to the residue at position 193 of SEQ ID NO: 47 is selected from the group consisting of alanine, phenylalanine, valine, and leucine and wherein (ii) said amino acid residue is substituted with isoleucine.

Claim 38 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 30, wherein (i) said amino acid residue corresponding to the residue at position 193 of SEQ ID NO: 47 is selected from the group consisting of alanine, phenylalanine, valine, and leucine and wherein (ii) said amino acid residue is substituted with methionine.

Claim 39 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein (i) said amino acid residue corresponding to the residue at position 108 of SEQ ID NO: 47 is selected from the group consisting of valine, leucine, isoleucine, and methionine, and wherein (ii) said amino acid residue is substituted with alanine.

Claim 40 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein (i) said amino acid residue corresponding to the residue at position 111 of SEQ ID NO: 47 is selected from the group consisting of phenylalanine, isoleucine, and leucine, and wherein (ii) said amino acid residue is substituted with alanine.

Claim 41 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein (i) said amino acid residue corresponding to the residue at position 114 of SEQ ID NO: 47 is selected from the group consisting of alanine, valine, leucine, isoleucine, and methionine, and wherein (ii) said amino acid residue is substituted with alanine.

Claim 42 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein (i) said amino acid residue corresponding to the residue at position 133 of SEQ ID NO: 47 is selected from the group consisting of phenylalanine, isoleucine, and leucine and wherein (ii) said amino acid residue is substituted with alanine.

Claim 43 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein (i) said amino acid residue corresponding to the residue at position 197 of SEQ ID NO: 47 is selected from the group consisting of leucine and isoleucine and wherein (ii) said amino acid residue is substituted with alanine.

Claim 44 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein accumulates normal membrane components compared to a β-Ketoacyl-acyl carrier protein synthase protein having said at least one unaltered residue.

Claim 45 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein accumulates longer than normal membrane components compared to a β-Ketoacyl-acyl carrier protein synthase protein having said at least one unaltered residue.

Claim 46 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein is more specific for the synthesis of eight carbon fatty acids compared to a β-Ketoacyl-acyl carrier protein synthase protein having said at least one unaltered residue.

Claim 47 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein (i) has an alanine substitution at positions corresponding to residues 108, 111, and 114 of SEQ ID NO: 47 and (ii) wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein synthesizes longer carbon chain fatty acids in transgenic plants compared to wild-type plants.

Claim 48 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein (i) has an alanine substitution at positions corresponding to residues 108, 111, and 114 of SEQ ID NO: 47 and (ii) wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein synthesizes longer carbon chain fatty acids in transgenic plants compared to a β-Ketoacyl-acyl carrier protein synthase protein having said at least one unaltered residue in transgenic plants.

Claim 49 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein (i) has an alanine substitution at positions corresponding to residues 108, 111, 114, 133, 197 of SEQ ID NO: 47 and (ii) wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein synthesizes longer carbon chain fatty acids in transgenic plants compared to wild-type plants.

Claim 50 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 4, wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein (i) has an alanine substitution at positions corresponding to residues 108, 111, 114, 133, 197 of SEQ ID NO: 47 and (ii) wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein synthesizes longer carbon chain fatty acids in transgenic plants compared to a β-Ketoacyl-acyl carrier protein synthase protein having said at least one unaltered residue in transgenic plants.

Claim 51 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 30, wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein has a reduced abilitity to utilize C8-ACP and longer substrates for condensation while still able to use the C6-ACP for elongation to produce C8 fatty acids.

Claim 52 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 30, wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein has an increased ability to utilize C6-ACP substrates for elongation compared to a β-Ketoacyl-acyl carrier protein synthase protein having said at least one unaltered residue.

Claim 53 (**currently amended**) An engineered β-Ketoacyl-acyl carrier protein synthase protein comprising an amino acid sequence (i) wherein said amino acid sequence of said engineered β-Ketoacyl-acyl carrier protein synthase protein has a substitution of at least one amino acid residue selected from the group consisting of amino acid residues at a position corresponding to residue 108, 134, 193, 202 and 342 of SEQ ID NO: 47, and (ii) wherein said substitution widens the hydrophobic fatty acid binding pocket ~~is of a nonpolar side chain to a smaller nonpolar side chain~~, and (iii) wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein has an altered ~~elongator molecule~~ substrate preference compared to a β-Ketoacyl-acyl carrier protein synthase protein having at least one unaltered amino acid residue selected from the group consisting of amino acid residues at a position corresponding to residue 108, 134, 193, 202 and 342 of SEQ ID NO: 47.

Claim 54 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 53, wherein said β-Ketoacyl-acyl carrier protein synthase protein is obtained from a prokaryotic source.

Claim 55 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 53, wherein said β-Ketoacyl-acyl carrier protein synthase protein is obtained from *Escherichia coli*.

Claim 56 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 53, wherein said β-Ketoacyl-acyl carrier protein synthase protein is obtained from a plant source.

Claim 57 (**currently amended**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 53, wherein a substrate ~~said elongator molecule~~ is ~~for~~ a molecule other than Malonyl-ACP.

Claim 58 (**previously presented**) The amino acid sequence of claim 53, wherein said engineered β-Ketoacyl-acyl carrier protein synthase protein produces a branched chained fatty acid.

Claim 59 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 53, wherein (i) said amino acid residue corresponding to the residue at position 108 of SEQ ID NO: 47 is selected from the group consisting of alanine, valine, leucine, isoleucine, and methionine, and wherein (ii) said amino acid residue is substituted with glycine.

Claim 60 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 53, wherein (i) said amino acid residue corresponding to the residue at position 134 of SEQ ID NO: 47 is selected from the group consisting of valine and isoleucine and wherein (ii) said amino acid residue is substituted with glycine.

Claim 61 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 53, wherein (i) said amino acid residue corresponding to the residue at position 134 of SEQ ID NO: 47 is selected from the group consisting of valine and isoleucine and wherein (ii) said amino acid residue is substituted with alanine.

Claim 62 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 53, wherein (i) said amino acid residue corresponding to the residue at position 193 of SEQ ID NO: 47 is selected from the group consisting of alanine, phenylalanine, valine, and leucine and wherein (ii) said amino acid residue is substituted with glycine.

Claim 63 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 53, wherein (i) said amino acid residue corresponding to the residue at position 202 of SEQ ID NO: 47 is a phenylalanine and wherein (ii) said phenylalanine is substituted with an amino acid residue selected from the group consisting of isoleucine, leucine, and glycine.

Claim 64 (**previously presented**) The engineered β-Ketoacyl-acyl carrier protein synthase protein of claim 53, wherein (i) said amino acid residue corresponding to the residue at position 342 of SEQ ID NO: 47 is a leucine and wherein (ii) said leucine is substituted with an amino acid residue selected from the group consisting of alanine and glycine.